

REMARKS

In the outstanding Official Action, the Examiner:

(1) indicated that Figures 1-9 should be designated by a legend such as "Prior Art" because only that which is old is illustrated;

(2) objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference characters not mentioned in the description: 206I, 206K, 212I, 212K and 312;

(3) objected to claim dependent 69 because the preamble does not match independent claim 4;

(4) rejected claims 49-52 and 58-59 under 35 USC 102(b) as being anticipated by Gabbert (US 6,038,239) ("Gabbert")

(5) rejected claims 1-7, 9, 12-14, 24-31, 33, 36-38 and 48 under 35 USC 102(e) as being anticipated by Ye et al. (US 6,542,287) ("Ye");

(6) rejected claims 53 and 69 under 35 USC 103(a) as being unpatentable over Gabbert and further in view of Yeniy et al. (US 2002/0118445) ("Yeniy")

(7) rejected claims 54-55 and 61 under 35 USC 103(a) as being unpatentable over Gabbert and further in view of Waarts et al. (US 6,212,310) ("Waarts");

(8) rejected claim 57 under 35 USC 103(a) as being unpatentable over Gabbert and further in view of Goldstein (US 6,522,465) ("Goldstein");

(9) rejected claims 8 and 32 under 35 USC 103(a) as being unpatentable over Ye and further in view of Yeniy;

(10) rejected claims 10, 16, 34 and 40 under 35 USC 103(a) as being unpatentable over Ye and further in view of Waarts; and

(11) objected to claims 11, 15, 17-23, 35, 39, 41-47, 56, 60 and 62-68 as being dependent upon a rejected base claim, but indicated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response to Item 1 above, Applicants have amended Figs. 1-4 to add the legend "Prior Art" because only that which is old is illustrated.

In response to Item 2 above, Applicants note that reference character 312 is mentioned on page 34, line 16 of the description. With regard to 206I, 206K, 212I and 212K, Applicants note that reference character 206 is used to identify an array of parallel waveguides, "where the array comprises a plurality (e.g., 2-10) of parallel waveguides 206A, 206B, 206C, etc." and that reference characters 212A, 212B, 212C, etc. are used to identify angled waveguides. While the word "etc." may imply that reference characters 206I, 206K would also be used to identify waveguides and 212I and 212K would also be used to identify angled waveguides, Applicants have amended the description to identify 206I and 206K as a waveguide and 212I and 212K as an angled waveguide. Applicants believe that these changes are sufficient to overcome the Examiner's objection to the drawings.

In response to Item 3 above, Applicants have amended claim 69 so that it now depends from claim 49.

In response to Items 4 through 10 above, Applicants respectfully disagree with the Examiner's rejections, however, Applicants have amended claims 1, 25 and 49 to more clearly define the present invention and distinguish it from the prior art.

More particularly, in response to Item 4, amended claim 49 now calls for a spectrally filtered high power broadband light source comprising an optical component configured to generate spectrally filtered amplified spontaneous emission (ASE) having a relatively short coherence length.

In contrast, Gabbert discloses a tunable laser light source having a broadband-amplifying, but narrowband-tunable, active medium, which is capable of suppressing broadband spontaneous emission. Thus, Gabbert teaches a tunable laser which uses a resonator to generate lasing, a broadband-amplifying active medium for providing amplification over the tuning range of the tunable laser, and an output having narrow linewidth at any wavelength within the tuning range of the laser. This is significantly different than the present invention, wherein the light source is a high power broadband light source generating amplified spontaneous emission (ASE) having a relatively short coherence length. The present invention does not constitute a laser and does not have a narrow linewidth output. Furthermore, the light source of the present invention is specifically configured to utilize ASE rather than to suppress it. Thus, claim 49 is believed to be allowable.

Claims 50-52 and 58-59 depend from claim 49, either directly or indirectly, and are believed to be allowable at least through dependency.

In response to Item (5) above, amended claim 1 now calls for a system for amplifying optical signals comprising an optical fiber for carrying the optical signals, a high power broadband light source comprising an optical component configured to generate amplified spontaneous emission (ASE) having a relatively short coherence length, and a connector for introducing the high

power broadband light source into the optical fiber as a Raman pump so as to induce Raman amplification of the optical signals within the fiber.

In contrast, the Ye pump source is a laser which, due to its resonant cavity, inherently has narrow linewidth output. This is in contrast to the present invention, where the pump source is a high power broadband light source capable of generating ASE having a relatively short coherence length. Applicants' pump source is not a laser, and effectively has "infinite" line outputs. Applicants' pump source does not have a feedback mirror to cause a lasing action. In fact, Applicants have deliberately avoided using a round-trip mirror feedback of the sort used to achieve lasing threshold and lasing action. This concept is neither taught nor rendered obvious by Ye. Thus, claim 1 is believed to be allowable.

Claims 1-7, 9, 12-14 and 24 depend from claim 1, either directly or indirectly, and are believed to be allowable at least through dependency.

Amended claim 25 now calls for a method for amplifying optical signals comprising introducing a high power broadband light source into an optical fiber carrying the optical signals so that the high power broadband light source acts as a Raman pump so as to induce Raman amplification of the optical signals within the fiber, wherein the high power broadband light source comprises an optical component configured to generate amplified spontaneous emission (ASE) having a relatively short coherence length.

As stated above, the Ye pump source is a laser. Ye does not teach a method for amplifying optical signals wherein the pump source is a high power broadband light source capable of

generating ASE having a relatively short coherence length. Thus, claim 25 is believed to be allowable.

Claims 26-31, 33, 36-38 and 48 depend from claim 25, either directly or indirectly, and are believed to be allowable at least through dependency.

In response to Item (6) above, claims 53 and 69 depend from claim 49 and are believed to be allowable at least through dependency.

In response to Item (7) above, claims 54-55 and 61 depend from claim 49 and are believed to be allowable at least through dependency.

In response to Item (8) above, claim 57 depends from claim 49 and is believed to be allowable at least through dependency.

In response to Item (9) above, claim 8 ultimately depends from claim 1 and claim 32 ultimately depends from claim 25. These claims are believed to be allowable at least through dependency.

In response to Item (10) above, claims 10 and 16 ultimately depend from claim 1 and claims 34 and 40 ultimately depend from claim 25. These claims are believed to be allowable at least through dependency.

In response to Item (11) above, Applicants have added new claims 70-96, which correspond to dependent claims 11, 15, 17-23, 35, 39, 41-47, 56, 60 and 62-68, respectively, and include all of the limitations of the base claim and any intervening claims.

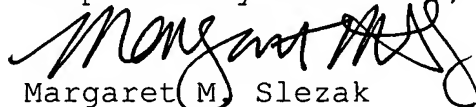
Applicants believe that claims 1-96 are now in condition for allowance, and allowance thereof is respectfully requested.

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In the event that any additional fees may be required in this matter, please charge the same to Deposit Account No. 16-0221.

Thank you.

Respectfully submitted,



Margaret M. Slezak

Registration No. 55,625

Pandiscio & Pandiscio, P.C.

470 Totten Pond Road

Waltham, MA 02451-1914

Tel. No.: (781) 290-0060

MMS/AHURA1.AMD

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Annotated Marked-up sheet

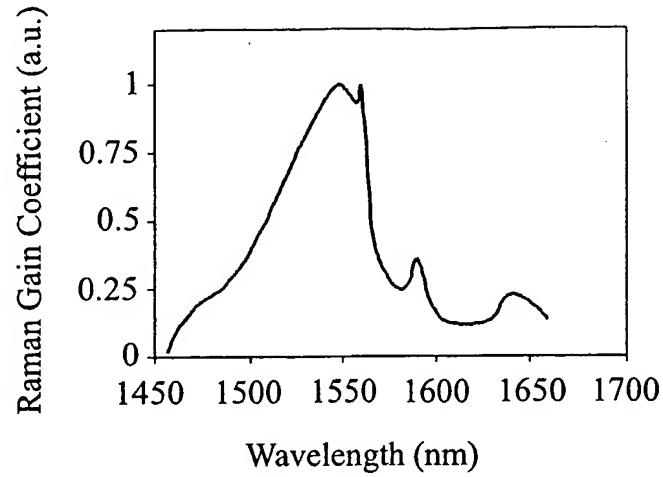


Fig. 1 - Normalized Raman Gain Spectrum of standard single mode fiber.
Pump wavelength is at 1450 nm.

Prior Art

Annotated Marked-up Sheet

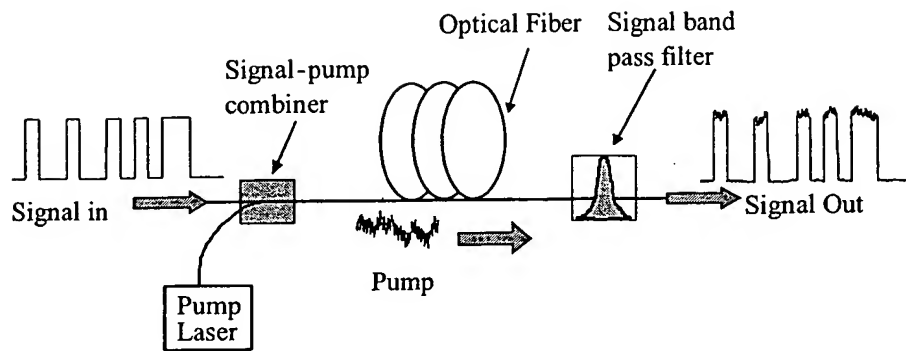


Fig. 2 - Distributed Raman amplification using forward pump (co propagating pump and signal). The noise of pump and signal beams are schematically drawn.

Prior Art

Annotated Marked-up Sheet

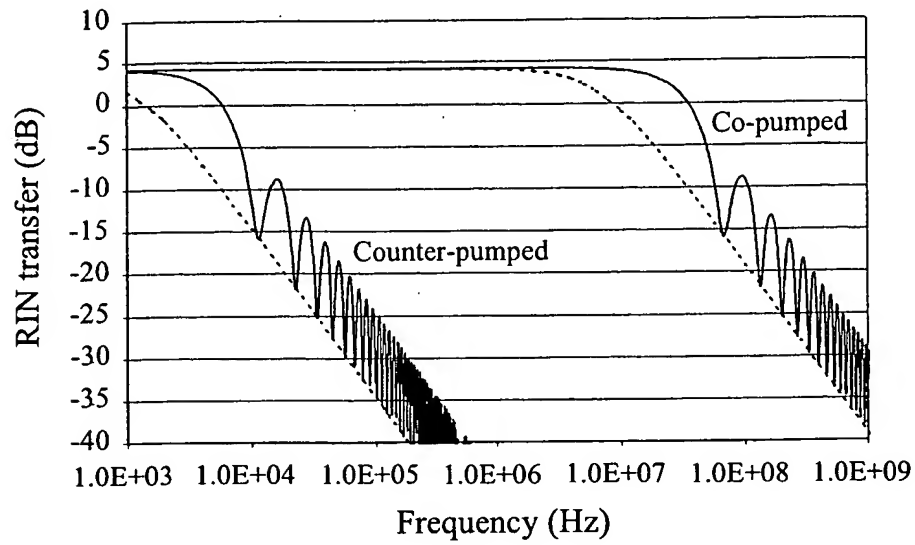


Fig. 3 - RIN transfer spectrum for a co- and counter-pumped Raman amplifier with 10 dB of gain. Pump attenuation = 0.29 dB/km, length = 10km (solid line) and 80km (dotted line), dispersion = $15.6 \text{ ps.nm km}^{-1}$, pump at 1455 nm and signal at 1555 nm [5].

Prior art

Annotated Marked-up Sheet

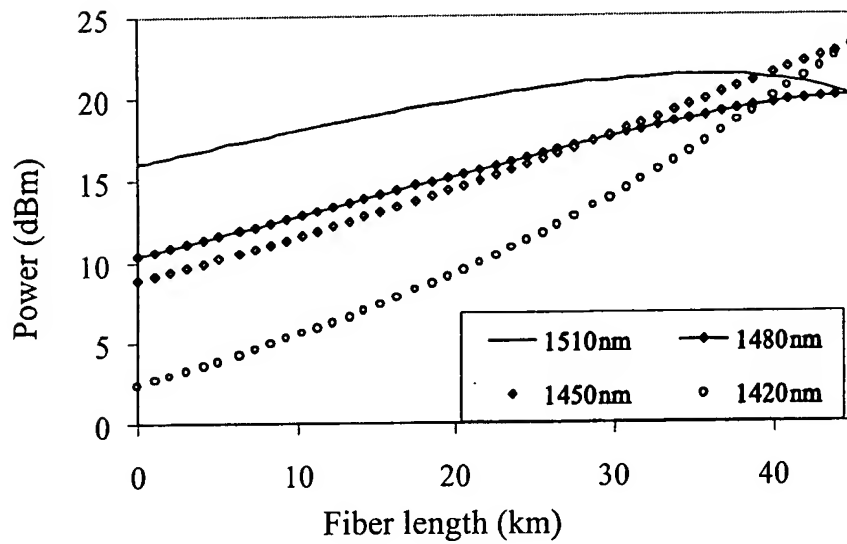


Fig. 4 - Power evolution of pump diode lasers along the fiber path. The pump wavelengths are: 1420 nm, 1450 nm, 1480 nm and 1510 nm. The longer wavelength pump (1510 nm) is amplified by short wavelength pumps.

Prior Art